

$$\textcircled{1} \sqrt{36} =$$

$$\begin{array}{c} \swarrow \searrow \\ 6 \quad 6 \end{array}$$

$$\sqrt{\textcircled{6 \cdot 6}}$$

$$\swarrow$$

$$6$$

$$\sqrt{20} =$$

$$\begin{array}{c} \swarrow \searrow \\ 4 \quad 5 \\ \swarrow \searrow \\ 2 \quad 2 \end{array}$$

$$= \sqrt{\cancel{2} \cdot 5}$$

$$2\sqrt{5}$$

$$\sqrt{75}$$

$$\begin{array}{c} \swarrow \searrow \\ 25 \quad 3 \\ \swarrow \searrow \\ 5 \quad 5 \end{array}$$

$$= \sqrt{\cancel{5} \cdot 3}$$

$$5\sqrt{3}$$

$$\sqrt{49} = \sqrt[2]{49}$$

square root

~~$$\sqrt{7^2}$$~~

$$\sqrt[3]{7 \cdot 7 \cdot 7}$$

$$\frac{\text{Index}}{\sqrt[n]{a}}$$

cube root

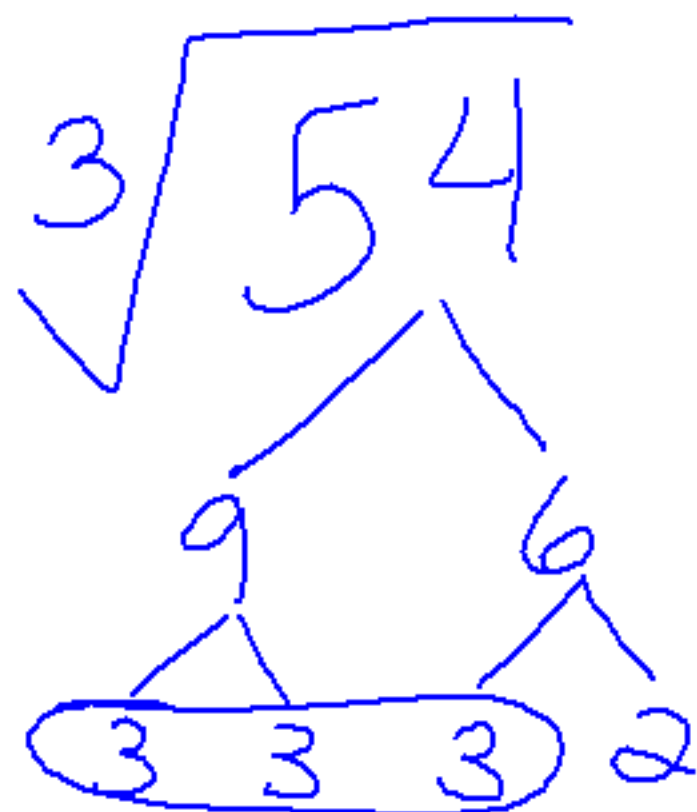
① $\sqrt[3]{24}$

$$= \sqrt[3]{2 \cdot 2 \cdot 2 \cdot 3}$$

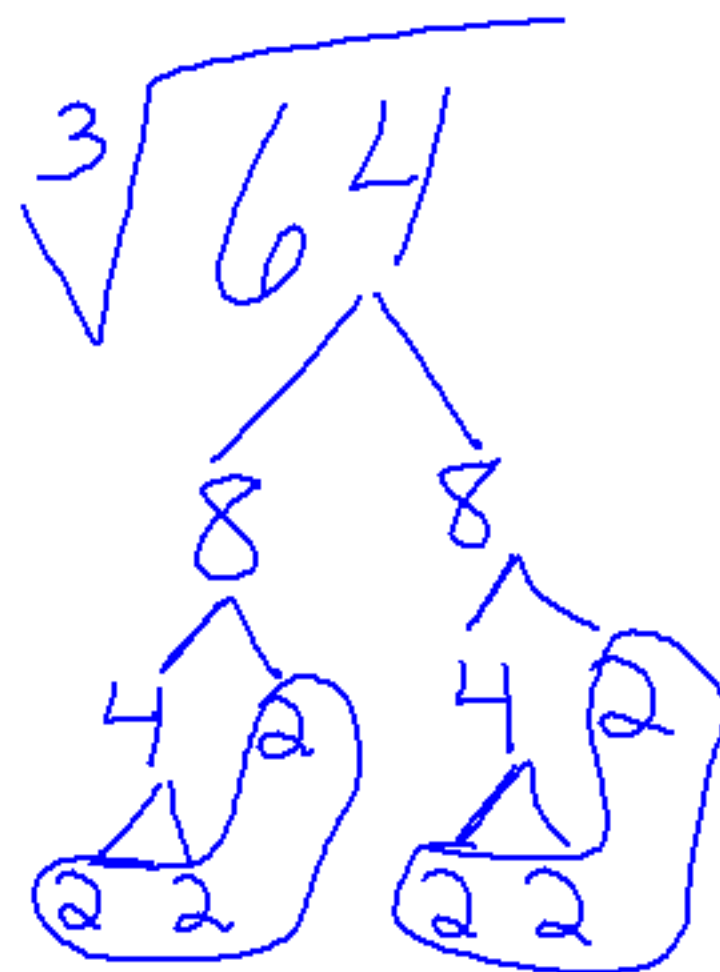
$$= \sqrt[3]{2^3 \cdot 3}$$

$$2 \cdot \sqrt[3]{3}$$

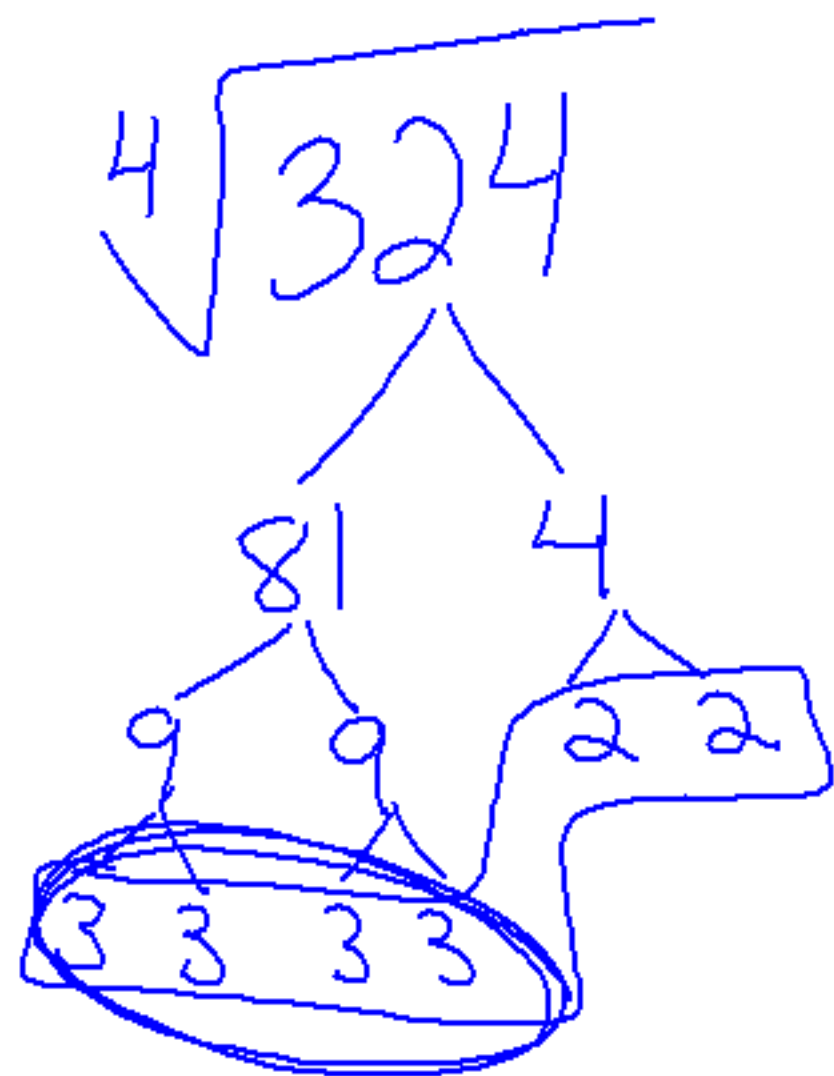
$$2\sqrt[3]{3}$$



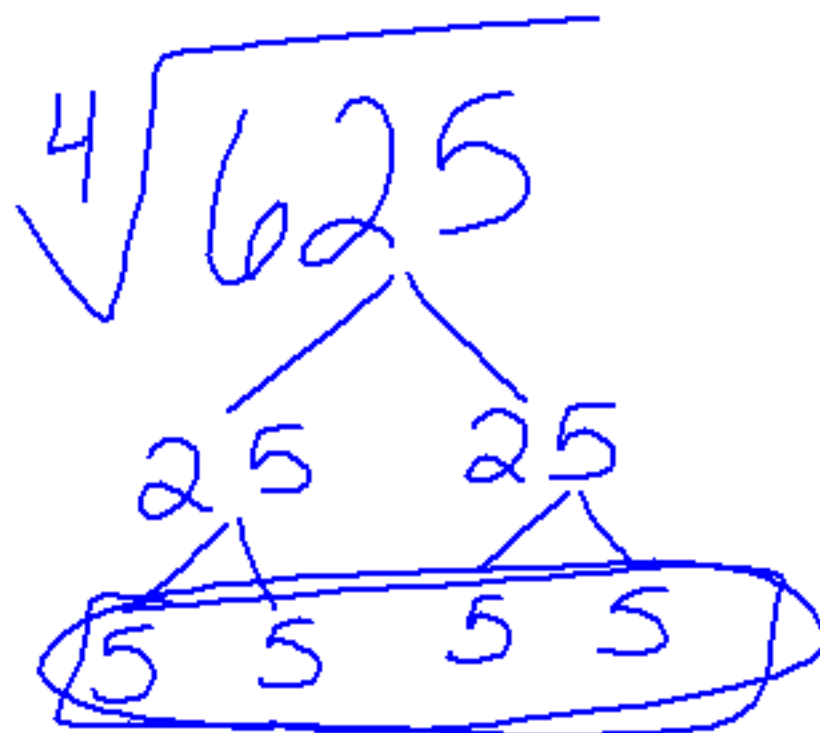
$$3 \sqrt[3]{2}$$



$$2 \cdot 2 = 4$$



$3\sqrt[4]{4}$



5

~~$4\sqrt{5}$~~

$$\sqrt[5]{128}$$



$$2\sqrt[5]{4}$$

⑦ $\sqrt[3]{270}$

Factor tree for 270:

```

    270
   /  \
  27   10
 /  \  /  \
3   9 5   2
 /  \
3   3
  
```

Grouped factors: $(3 \times 3 \times 3) \times (5 \times 2)$

$3\sqrt[3]{10}$

⑧ $\sqrt[4]{1250}$

Factor tree for 1250:

```

    1250
   /    \
  125    10
 /  \   /  \
5   25 5   2
 /  \
5   5
  
```

Grouped factors: $(5 \times 5 \times 5) \times (2 \times 5)$

$5\sqrt[4]{2}$

⑨ $\sqrt[5]{224}$

Factor tree for 224:

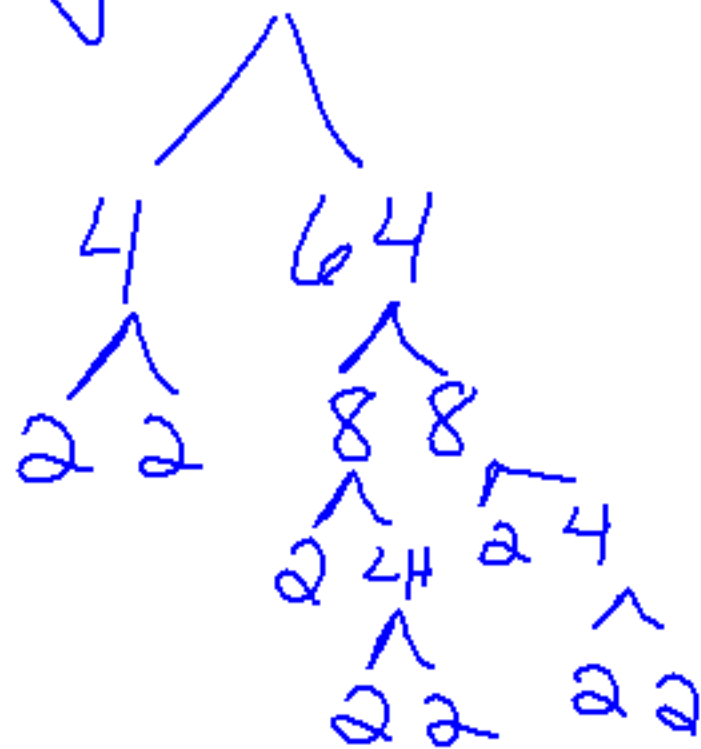
```

    224
   /  \
  4    56
 /  \  /  \
2   2 4   14
      /  \
     2   7
  
```

Grouped factors: $(2 \times 2 \times 2 \times 2 \times 2) \times 7$

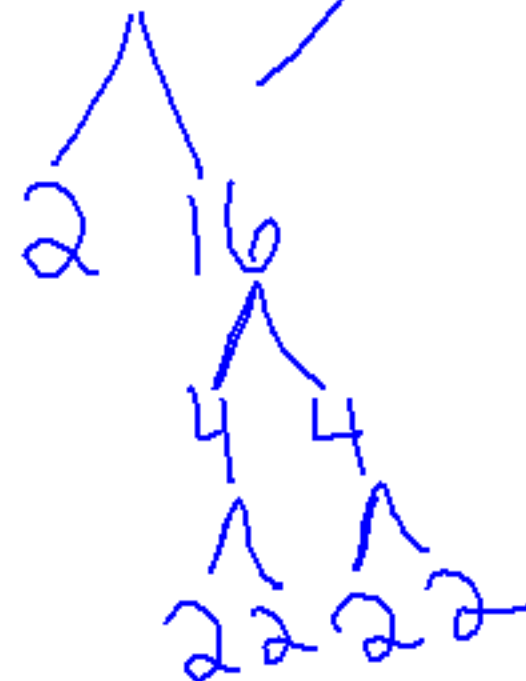
$2\sqrt[5]{7}$

⑩ $\sqrt[4]{256} =$



$2 \cdot 2 = \textcircled{4}$

⑪ $(5\sqrt{32})^3$



$(2)^3 = 2^3$
 $= \textcircled{8}$

⑫ $(\sqrt[3]{27})^2$

3

3 3

$(3)^2$

9

⑬ 625

⑭ 9

⑮ 64

$$\sqrt{a} = a^{1/2}$$

$$\sqrt[3]{a} = a^{1/3}$$

$$\sqrt[4]{a} = a^{1/4}$$

$$\sqrt[6]{a} = a^{1/6}$$

$$\left(\sqrt[3]{a}\right)^4$$

$$\left(a^{1/3}\right)^4$$

$$a^{4/3}$$

$$(\sqrt{a})^5$$

$$(a^{1/2})^5$$

$$a^{5/2}$$

$$(\sqrt[5]{a})^4$$

$$(a^{1/5})^4$$

$$a^{4/5}$$

16

$$27^{2/3}$$

$$(27^{1/3})^2$$

$$(\sqrt[3]{27})^2$$



$$(3)^2$$

$$= 9$$

17

$$16^{3/4}$$

$$(16^{1/4})^3$$

$$(\sqrt[4]{16})^3$$



$$(2)^3$$

$$= 8$$

$$x^{-2} = \frac{1}{x^2}$$

$$343^{-1/3} = \frac{1}{343^{1/3}} = \frac{1}{\sqrt[3]{343}}$$

$$\textcircled{19} \quad 64^{\frac{1}{2}} = \sqrt{64} = \textcircled{8}$$

$$\textcircled{20} \quad 32^{\frac{2}{5}} = \left(32^{\frac{1}{5}}\right)^2 = \left(\sqrt[5]{32}\right)^2 = (2)^2 = \textcircled{4}$$



$$\textcircled{21} \quad \frac{1}{8^{\frac{5}{3}}} = \frac{1}{\left(\sqrt[3]{8}\right)^5} = \frac{1}{(2)^5} = \boxed{\frac{1}{32}}$$

$$1) 11^{1/3}$$

$$2) 16^{5/9}$$

$$3) 6$$

$$4) 5^{3/2}$$

$$5) -7$$

$$6) 25$$

$$7) -15$$

$$8) \frac{1}{27}$$

$$9) 3\sqrt[4]{4}$$

$$10) 6\sqrt[3]{3}$$

$$11) 2\sqrt[5]{4}$$